In [2]:
```
# AI for Sales & Advertizing - Sell like the Wolf of AI Street

# Importing the libraries
import numpy as np
import matplotlib.pyplot as plt
import random
```

In [3]:
```
# Setting the parameters
N = 10000
d = 9
```

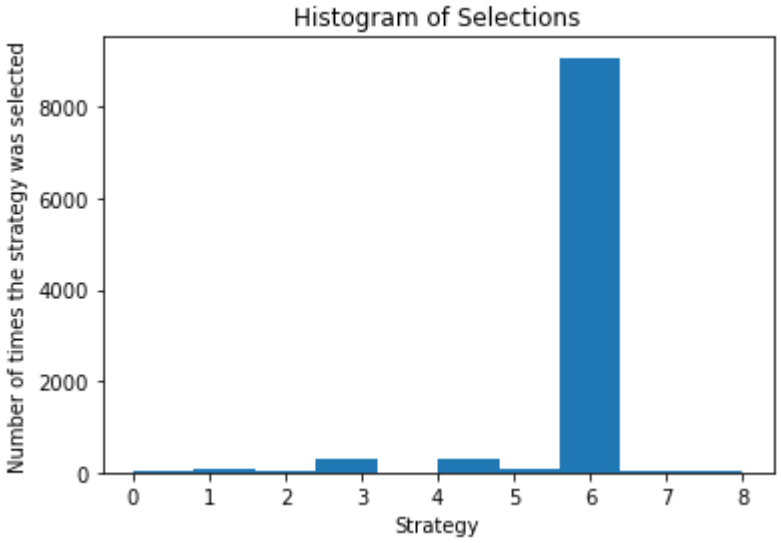
In [5]:
```
# Building the environment inside a simulation
conversion_rates = [0.05,0.13,0.09,0.16,0.11,0.04,0.20,0.08,0.01]
X = np.array(np.zeros([N,d]))
for i in range(N):
    for j in range(d):
        if np.random.rand() <= conversion_rates[j]:
            X[i,j] = 1
```

In [8]:
```
# Implementing Random Selection and Thompson Sampling
strategies_selected_rs = []
strategies_selected_ts = []
total_reward_rs = 0
total_reward_ts = 0
numbers_of_rewards_1 = [0] * d
numbers_of_rewards_0 = [0] * d
for n in range(0, N):
    # Random Selection
    strategy_rs = random.randrange(d)
    strategies_selected_rs.append(strategy_rs)
    reward_rs = X[n, strategy_rs]
    total_reward_rs = total_reward_rs + reward_rs
    # Thompson Sampling
    strategy_ts = 0
    max_random = 0
    for i in range(0, d):
        random_beta = random.betavariate(numbers_of_rewards_1[i] + 1, numbers
        if random_beta > max_random:
            max_random = random_beta
            strategy_ts = i
    reward_ts = X[n, strategy_ts]
    if reward_ts == 1:
        numbers_of_rewards_1[strategy_ts] = numbers_of_rewards_1[strategy_ts]
    else:
        numbers_of_rewards_0[strategy_ts] = numbers_of_rewards_0[strategy_ts]
    strategies_selected_ts.append(strategy_ts)
    total_reward_ts = total_reward_ts + reward_ts
```

In [9]:
```
# Computing the Relative Return
relative_return = (total_reward_ts - total_reward_rs) / total_reward_rs * 100
print("Relative Return: {:.0f} %".format(relative_return))
```

```
Relative Return: 95 %
```

In [10]:
```
# Plotting the Histogram of Selections
plt.hist(strategies_selected_ts)
plt.title('Histogram of Selections')
plt.xlabel('Strategy')
plt.ylabel('Number of times the strategy was selected')
plt.show()
```



In [ ]:
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